

Upton Street, N.W. Traffic Calming Study

Prepared for:

**District Department of Transportation
Transportation Policy and Planning Administration**

Prepared By:

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I INTRODUCTION

Precision Systems Inc. (PSI) has been asked to provide a traffic calming study for Upton Street, N.W. from Reno Road to Wisconsin Avenue (see Figure 1 in Appendix). The **District Department of Transportation (DDOT)** has asked **PSI** to review neighborhood traffic calming requests and to investigate the potential implementation of traffic calming measures, in compliance with the ***District of Columbia Traffic Calming Policies and Guidelines 2002***, to reduce speed, traffic volume and traffic noise so that the traffic safety in the study area can be improved.

The primary purpose of this traffic calming study, as determined by analysis and through public feed back, is to recommend feasible solutions to calm traffic through a variety of vehicular traffic volume and speed reduction devices. The existing conditions of the site including traffic volume, speed readings, accident records, street geometry surrounding public schools and public access locations will determine which means and locations of traffic calming measures will best improve traffic safety for the study area. Any recommendations deemed acceptable by **DDOT** and the public will be implemented in the field and further studied by **DDOT** for their effectiveness in achieving traffic calming objectives after a 6-month time period.

II STUDY FINDINGS

Upton Street, N.W. from Reno Road to Wisconsin Avenue has the functional classification of a local street, zoned R1-B. Study findings include the following:

1. Site geometry and existing conditions

Upton Street from Reno Road to Wisconsin Avenue is 2,150 feet long and 33 feet wide. At the intersection with Wisconsin Ave, it has the highest altitude of 379 feet and the lowest altitude of 302 feet at the intersection with Reno Road (Figure 1). The grade varies from west to east. It is about 3% in between Wisconsin Avenue and 38th Street, about 6% in between 38th Street and 37th Street and 3% in between 37th Street and Reno Road.

Approximately half of the pavement is in poor condition. There are no curb and gutters in some locations such as between Wisconsin Avenue and 38th Street. The traffic island at the intersection with Reno Road is in poor condition (Figure 4-6, Appendix).

2. Surroundings

There are totally 40 houses along Upton Street, 28 are in 3600 block, 8 in 3700 block and 4 in 3800 block. The Washington Home, a public home for seniors, is located in the south side of 3800 block. Other buildings like a post office, bank and public parking garage are located near the intersection with Wisconsin Avenue. There are 6 drive-ways including one with access to the Washington Home.

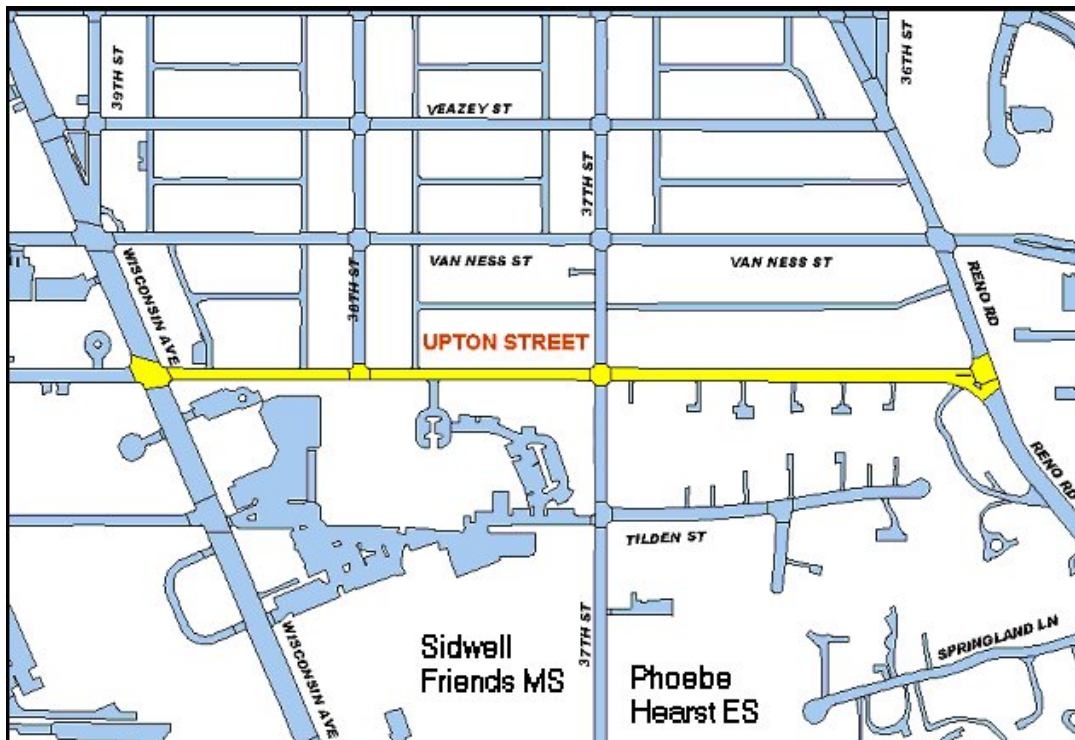


Figure 1 Map of the study area

Sidwell Friends Middle School and Phoebe Hearst Elementary School are located south of Upton Street. Traffic accessing these schools is using 37th Street and some of them make left or right turns at the intersection with 37th Street taking Upton Street to reach Reno Road and Wisconsin Avenue.

3. Traffic control devices and signage

The intersection with Wisconsin Avenue is signalized. Others including the intersections with 38th Street, 37th Street and Reno Road are controlled by stop signs.

At the intersection of Upton Street and Wisconsin Avenue, N.W., the lane marking at the eastbound approach on Upton Street has LEFT-ONLY and RIGHT-ONLY marking. The lane marking at westbound approach has RIGHT-ONLY marking. The northbound approach has leading left turn signal. The southbound left turn is signal prohibited but without regulation signs or lane markings. However, eastbound illegal through traffic, westbound illegal through and left-turn traffic, and southbound illegal left turn traffic were observed.

At the intersection of Upton Street and Reno Road, N.W., the northbound left turn is prohibited at 4-6:30 PM by regulation signs. However, illegal left turn traffic was observed.

Several faded or graffiti signs were observed (Figure 7-10, Appendix).

4. Traffic Conditions

Cut through traffic on Upton Street between Reno Road and Wisconsin Avenue contributes the most to the traffic volume concerns of the area. Traffic through 37th Street accessing the schools make left or right turns at Upton Street to approach Wisconsin Avenue and/or Reno Road, rather than taking Van Ness Street, which has a functional classification of a collector street. Traffic accessing the Washington Home, which is located on the south side of Upton Street between 37th Street and Wisconsin Avenue, is not a concern according to interviews with the residents. Only a few pedestrians were observed on Upton Street. No bicycles riders were observed in this area.

The posted speed limit varies from 25 MPH at both ends with Reno Road and Wisconsin Avenue to “15 MPH when children are present” at 37 Street, from where Sidwell Friends Middle School and Phoebe Hearst Elementary School are located. Speed was read by radar at two locations (Figure 11 and Table 9, Appendix): (1) middle of 3600 block of Upton Street, (2) and middle of 37th Street between Upton Street and Tilden Street. It is showed in Table 9 in Appendix that the 85th percentile speed¹ was 31 mph on Upton Street and 25 mph on 37th Street. The highest speed recorded was 38 mph Upton Street and 32 mph on 37th Street.

¹ 85th percentile speed – the speed at or below which 85% of the vehicles are moving.

Traffic volumes at four intersections: Wisconsin Avenue and Upton Street, Wisconsin Avenue and Van Ness Street, Reno Road and Upton Street, and Reno Road and Van Ness Street were obtained from the Traffic Safety Division of DDOT (Table 2-5, Appendix). In addition, traffic volume was counted and speed was recorded at various locations during May–June in year 2003 (Figure 11 and Table 6-8, Appendix). Traffic volume was counted at three locations: (1) middle of 3800 block of Upton Street, (2) middle of 3600 block of Upton Street, (3) and middle of 37th Street between Upton Street and Tilden Street.

The different totals between DDOT counts and PSI counts are due to the fact that the counts were taken during different seasons and years. The eastbound AM peak hour traffic on both the 3600 block and 3800 block of Upton Street has increased by 100 to a total of 256 and 164 respectively. The westbound PM peak hour traffic on both 3600 block and 3800 block of Upton Street has increased by 90 to a total of 138 and 144 respectively. Therefore, the traffic volumes counts from both sources have been adjusted to reflect the current conditions before being used for the computerized traffic analysis. The adjusted turning movement volumes are in proportion with the DDOT counts (shown in Figure 2-1, 2-2, 3-1, and 3-2).

The traffic volume from DDOT also shows the existing illegal movements: (1) eastbound through traffic, westbound through and left-turn traffic, and southbound left turn at the intersection of Upton Street and Wisconsin Avenue, (2) northbound left-turn traffic at the intersection of Upton Street and Reno Road in 4-6:30 PM.

About 178 vehicles on northbound Reno Road turn left onto Upton Street during the AM peak hour most likely because of the backups in making the left turn at Van Ness intersection. A left-turn prohibition in AM peak hour will discourage the cut-through traffic, but may also cause inconvenience for some local residents reaching their homes and will require utilizing other routes.

5. Intersection level of service

Existing traffic condition on Upton Street, Van Ness Street, Wisconsin Avenue, Reno Road 37th Street and 38th Street was analyzed and simulated with computer programs of SYNCHRO and SimTraffic. The intersection of Wisconsin Avenue and Upton Street has a Level of Service (LOS)² A during both AM and PM peak hours. Both two intersections at Wisconsin Avenue & Van Ness Street and Reno Road & Van Ness Street have a LOS D during AM peak hour and B during PM peak hour. LOS A indicates that the traffic at the intersection operated as “free flow”³ and LOS D indicates that the traffic operated as “approaching unstable flow”.

² The Level of Service (LOS) for the intersection is classified by Control Delay Per Vehicle (s). LOS A (<=10 sec), LOS B (>10 and <=20), LOS C (>20 and <=35), LOS D (>35 and <=55), LOS E (>55 and <=80), and LOS F (>80).

³ District of Columbia Traffic Calming Policies and Guidelines, 2002

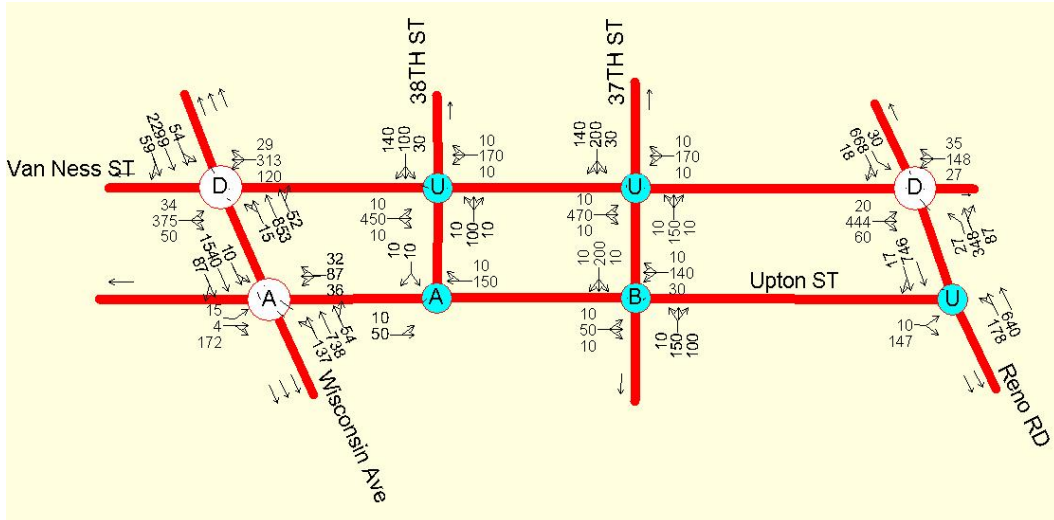


Figure 2-1 Intersection level of service (AM) – traffic volume data obtained from DDOT

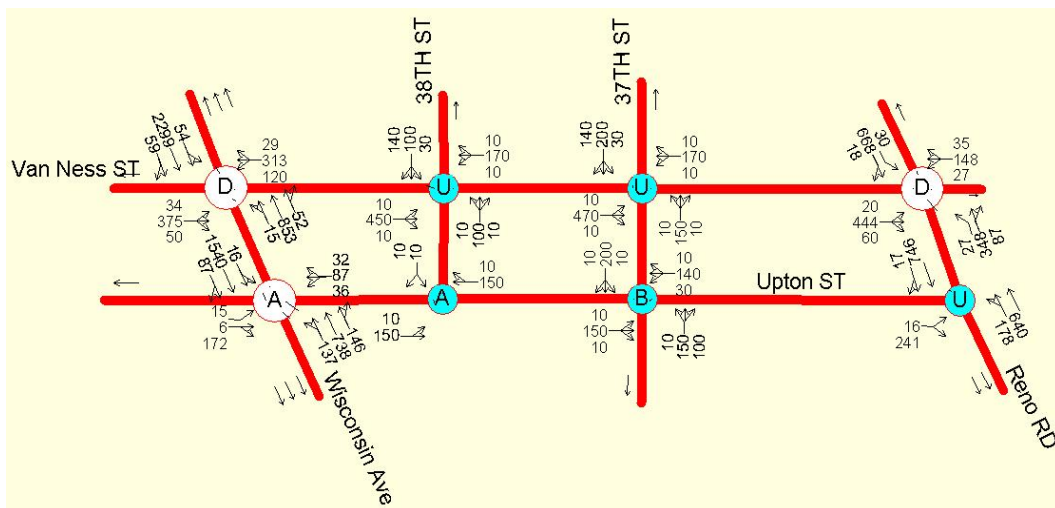


Figure 2-2 Intersection level of service (AM) – traffic volume data adjusted

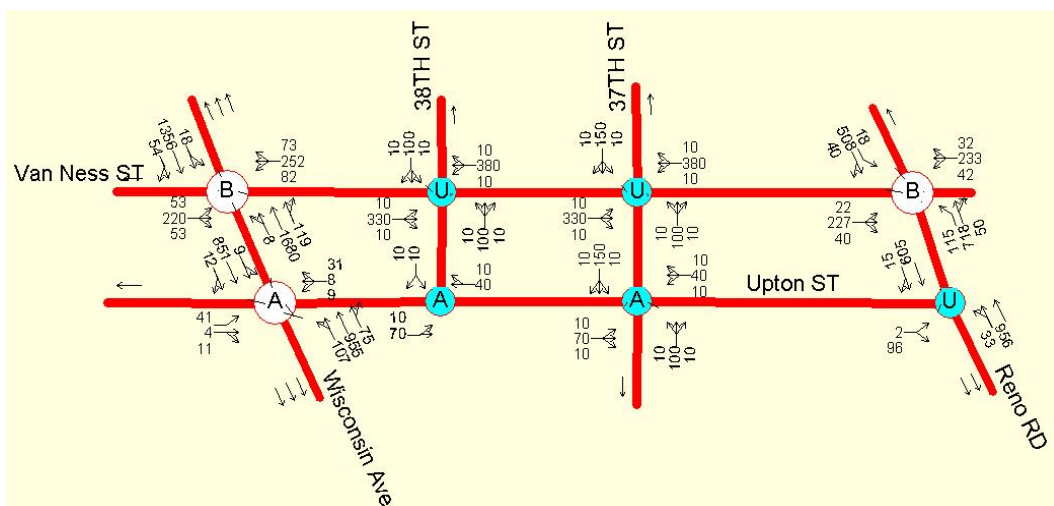


Figure 3-1 Intersection level of service (PM) – traffic volume data obtained from DDOT

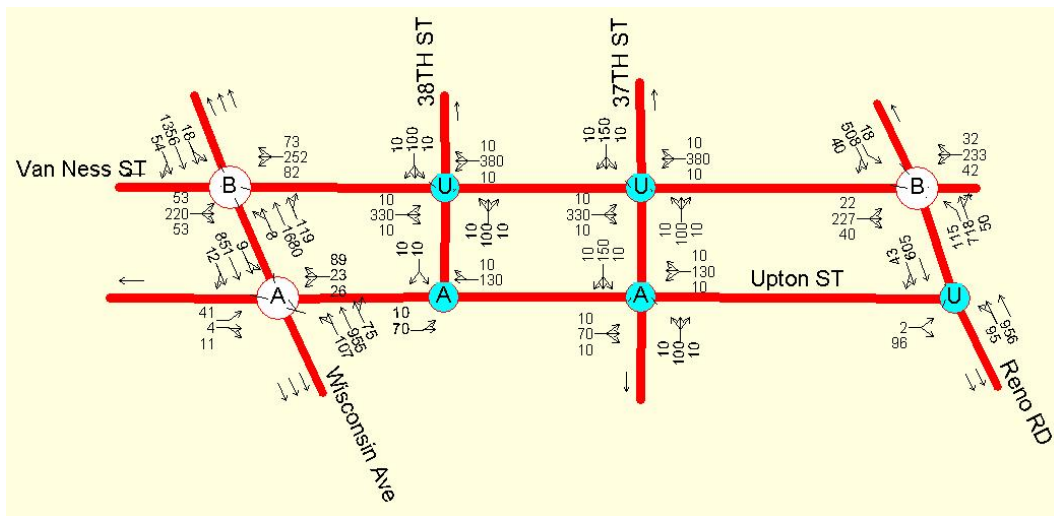


Figure 3-2 Intersection level of service (PM) – traffic volume data adjusted

6. Traffic accidents

According to the traffic accident records available in the Traffic Safety Division of DDOT, accidents related to Upton Street and Van Ness Street traffic in most recent three years from 2000 to 2002 are listed in Table 14 and 15. The total traffic accidents in these three years are 42 at the intersection of Wisconsin Avenue and Upton Street, 34 at the intersection of Wisconsin Ave and Van Ness Street, 4 at the intersection of Reno Road and Upton Street, 3 at the intersection of Reno Road and Van Ness Street, and 2 at all other intersections except the intersection of 37th Street and Van Ness Street, which had no accident.

7. Street parking

Upton Street is a local street with two-side residential parking allowed. It is not a snow emergency route and through trucks over 1 ¼ tons are not allowed. Most signs are two-hour residential parking permit, no parking or standing any time, speed limit, stop sign and school zone signs.

It is estimated that street parking occurs on over 50% in 3600 block, and over 90% in 3800 block most likely due to the post office.

III RECOMMENDATIONS

The recommendations in this study are aimed at solving the three major existing problems or concerns on Upton Street as follows:

- ❖ Traffic Volume
- ❖ Traffic Speed
- ❖ Safety Improvement

PSI utilized the *District of Columbia Traffic Calming Policies and Guidelines 2002*, and also the *Traffic Calming – State of the Practice*, published by **Institute of Transportation Engineers**. According to the traffic calming practices in the United States, **Speed Humps**, **NO LEFT TURN** signs and **Traffic Circles** will effectively reduce the traffic volume and speed without causing too much restriction on local traffic, as shown in Table 16 and 17. **Speed Humps** will effectively reduce the traffic speed to 15MPH to 20MPH. It can also discourage through traffic. Based on data published in *Traffic Calming – State of The Practice*, daily through traffic can be reduced by up to 18% by installing speed humps in addition to speed reduction (by up to 22%). The cost to install these three measures is also relatively low.

Therefore, PSI recommends:

1. Install two 12' wide 4" high speed humps in the middle of the 3600 block and 3700 block. The typical cross section of the speed hump and their recommended locations are attached in the Appendix. "Hump Ahead" warning signs should also be installed.
2. Install **NO LEFT TURN** signs at the intersection with Wisconsin Avenue to comply with the traffic signal. Currently a straight arrow signal head already prohibits left turns of southbound traffic. Lane markings at both northbound and southbound approaches are also recommended. Both the sign and lane markings will discourage the observed southbound illegal left turn traffic. Residents can utilize Van Ness Street, 37th Street and 38th Street to reach their homes.
3. Build a new island on Upton Street at the intersection with Wisconsin Avenue to channelize the right-in and right-out traffic. The island will discourage the observed eastbound illegal through traffic, westbound illegal through and left-turn traffic. Also, the faded RIGHT-ONLY marking needs to be remarked and the "RIGHT LANE MUST TURN RIGHT" sign needs to be replaced with "RIGHT TURN ONLY" sign.
4. Build two small traffic circles at the intersection with 37th Street and 38th Street to slow down traffic and discourage cut through traffic. The diameter of the island should be 10 feet. This will narrow the roadway approaches to these intersections without infringing on private property.

5. Redesign and build the south side curb on Upton Street at the intersection with Reno Road to merge the separated left and right turn lanes into one. Enlarge and rebuild the median island at this intersection to discourage U turns and cut through traffic. Replace the existing “No Left Turn 4-6:30PM” restriction with “No Left Turn 7-9:30AM 4-6:30PM” on northbound Reno Road at this intersection. Residents can utilize Van Ness Street, 37th Street and 38th Street to reach their homes.
6. Redesign the double yellow centerline on the street and stripe white edge lines around all parking areas. Edge lines give the impression that the roadway is narrow and most drivers slow down. It also reduces side swiping parked vehicles.
7. Replace faded or graffiti signs.

The recommendations listed above will reduce speeds, traffic volumes and improve safety for children and other pedestrians. Cut-through traffic will be encouraged to utilize Van Ness Street which is a collector street intended to carry traffic between Wisconsin Avenue and Upton Street, N.W.

IV COST ESTIMATES

Table 1. Quantities and cost estimates for traffic calming measures

Items	Quantities	Unit	Unit Price	Sum
12-foot Speed Humps	2	EACH	\$2,500 ⁴	\$5,000
Marking on humps	4	EACH DIRECTION	\$77	\$308
HUMPS AHEAD Signs	4	EACH	\$87	\$348
NO LEFT TURN Signs 7-9:30AM 4-6:30PM	2	EACH	\$87	\$174
KEEP RIGHT Signs	2	EACH	\$87	\$174
CIRCLE AHEAD Signs	4	EACH	\$87	\$348
10 FEET CIRCLES	2	EACH	\$4,000	\$8,000
Replace graffiti signs	6	EACH	\$87	\$522
Edge line around parking	3300	FOOT	\$1	\$3,300
Rebuild the median on Upton St. at the intersection with Reno Rd.	1	EACH	\$4,500	\$4,500
Rebuild the eastbound approach on Upton St. at the intersection with Reno Rd.			\$17,000	\$17,000
New Traffic Island on Upton St. at the intersection with Wisconsin Ave.	1	EACH	\$3,200	\$3,200
Total Cost				\$42,874

⁴ Based on DDOT 1999 estimates.

V APPENDIX

1. Existing Condition



Figure 4 Intersection of Upton Street and Reno Road, N.W. (Typical)



Figure 5 Block 3600 on Upton Street, N.W. (Typical)



Figure 6 Block 3800 on Upton Street, N.W. (Typical)



Figure 7 Faded or graffiti Sign (Typical)



Figure 8 Faded or graffiti Sign (Typical)



Figure 9 Faded or graffiti Signs (Typical)



Figure 10 Faded or graffiti Sign (Typical)

2. Turning Movement⁵

Table 2 Traffic volume at intersection of Wisconsin Avenue and Upton Street, NW

	EB Left	EB Thru	EB Right	Peds	WB Left	WB Thru	WB Right	Peds
AM	15	4 ⁶	172	87	36	87	32	71
PM	41	4	11	36	9	8	31	77
	NWB Left	NWB Thru	NWB Right	Peds	SEB Left	SEB Thru	SEB Right	Peds
AM	137	738	54	30	10	1540	87	25
PM	107	955	75	87	9	851	12	14

Table 3 Traffic volume at intersection of Reno Road and Upton Street, NW

	EB Left	EB Right	Peds	NWB Left	NWB Thru	Peds	SEB Thru	SEB Right	Peds
AM	10	147	3	178	640	0	746	17	2
PM	2	96	2	33	956	0	605	15	0

⁵ Turning movement data is obtained from Traffic Safety Division of District Department of Transportation

⁶ Illegal movements are shaded

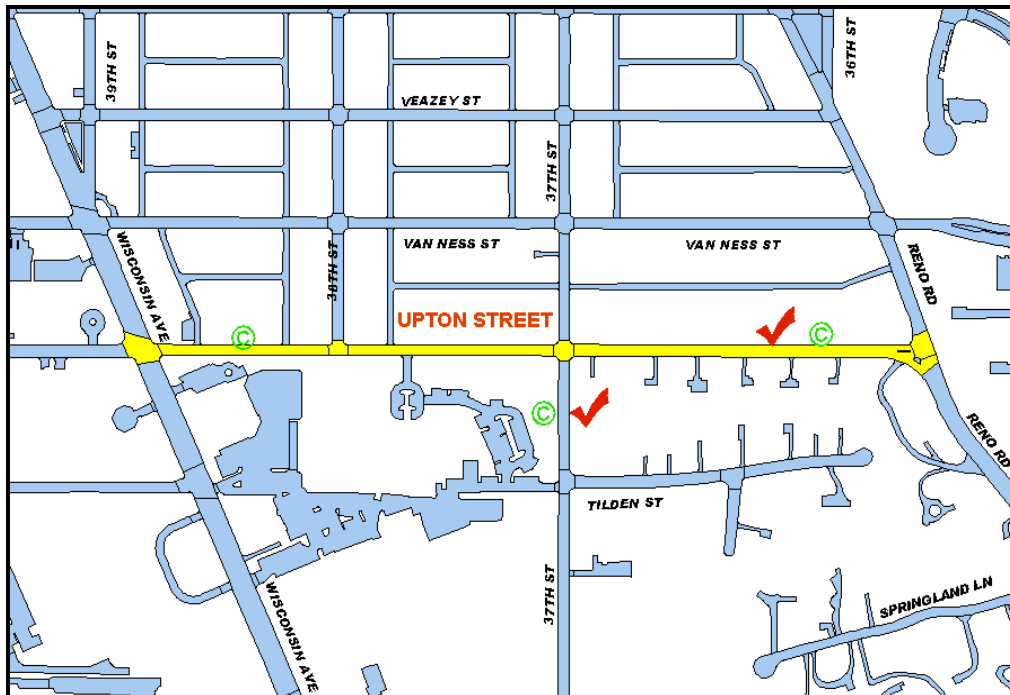
Table 4 Traffic volume at intersection of Wisconsin Avenue and Van Ness Street, NW

	EB Left	EB Thru	EB Right	Peds	WB Left	WB Thru	WB Right	Peds
AM	34	375	50	4	120	313	29	5
PM	53	220	53	27	82	252	73	32
	NWB Left	NWB Thru	NWB Right	Peds	SEB Left	SEB Thru	SEB Right	Peds
AM	15	853	52	20	54	2299	59	28
PM	8	1680	119	49	18	1356	54	24

Table 5 Traffic volume at intersection of Reno Road and Van Ness Street, NW

	EB Left	EB Thru	EB Right	Peds	WB Left	WB Thru	WB Right	Peds
AM	20	444	60	3	27	148	35	62
PM	14	227	40	10	42	233	32	17
	NWB Left	NWB Thru	NWB Right	Peds	SEB Left	SEB Thru	SEB Right	Peds
AM	27	348	87	35	30	668	18	14
PM	115	718	50	5	18	508	40	8

3. Speed Reading and Traffic Volume Counts



- © Traffic count spots
- ✓ Radar speed checking spots

Figure 11 Traffic count and radar speed checking spots in Upton Street

Table 6 Hourly traffic volume data on 3800 block of Upton St. NW

Begin Time	3800 block of Upton St. NW			
	Eastbound		Westbound	
	Weekday Average	Weekend Average	Weekday Average	Weekend Average
	5/15/03-5/16/03	5/17/03-5/18/03	5/15/03-5/16/03	5/17/03-5/18/03
5am	18	9	16	6
6am	38	15	33	14
7am	100	35	110	27
8am	164	41	130	35
9am	118	43	98	39
10am	71	50	86	55
11am	92	82	94	75
12noon	87	83	108	100
1pm	98	101	130	103
2pm	104	112	130	134
3pm	106	126	159	105
4pm	102	79	144	115
5pm	97	60	143	66
6pm	111	78	119	70
7pm	82	62	90	64
8pm	60	42	72	44

Table 7 Hourly traffic volume data on 3600 block of Upton St. NW

Begin Time	3600 block of Upton St. NW			
	Eastbound		Westbound	
	Weekday Average	Weekend Average	Weekday Average	Weekend Average
	5/15/03-5/16/03	5/17/03-5/18/03	5/15/03-5/16/03	5/17/03-5/18/03
5am	9	7	17	12
6am	17	7	56	22
7am	106	24	193	35
8am	256	22	210	56
9am	124	45	124	58
10am	65	52	105	65
11am	90	70	98	90
12noon	82	84	104	106
1pm	84	77	102	114
2pm	92	86	120	131
3pm	151	59	138	154
4pm	134	62	78	92
5pm	127	71	65	79
6pm	100	52	116	64
7pm	68	56	97	55
8pm	52	38	55	29

Table 8 Hourly traffic volume data on 37th St. Between Upton St. and Tilden St. NW

Begin Time	37 th St. Between Upton St. and Tilden St. NW			
	Northbound		Southbound	
	Weekday Average	Weekend Average	Weekday Average	Weekend Average
	5/14/03-5/16/03	5/17/03-5/18/03	5/14/03-5/16/03	5/17/03
5am	8	4	9	3
6am	12	4	35	10
7am	124	21	295	8
8am	161	24	287	16
9am	108	48	135	62
10am	59	49	75	75
11am	82	55	73	76
12noon	71	37	63	61
1pm	117	36	62	61
2pm	124	57	74	66
3pm	180	41	155	63
4pm	176	31	126	53
5pm	117	28	173	52
6pm	109	15	120	49
7pm	72	15	43	14
8pm	40	8	21	15

Table 9 Vehicle speed data collected by speed radars

Location		Date	Day	Time	Lowest Speed	Highest Speed	Average Speed	85th Percentile Speed	Vehicles Observed
Upton St., Mid-way Between 37 th And Reno Rd., NW	Eastbound	5/23/2003	Fri	7- 8 am	16	35	26	29	100
	Westbound	5/23/2003	Fri	7- 8 am	17	38	26	29	100
	Eastbound	5/30/2003	Fri	10 -11am	17	38	27	31	73
	Westbound	5/30/2003	Fri	10 -11am	17	38	28	31	86
	Eastbound	5/28/2003	Wed	4 - 5 pm	17	34	26	30	100
	Westbound	5/28/2003	Wed	4 - 5 pm	18	32	26	30	37
37 th St., Mid-way Between Upton St. and Tilden St. NW	Northbound	5/23/2003	Fri	7- 8 am	15	28	19	22	90
	Southbound	5/23/2003	Fri	7- 8 am	15	28	19	22	100
	Northbound	5/30/2003	Fri	11:30-12:30pm	15	28	21	25	52
	Southbound	5/30/2003	Fri	11:30-12:30pm	15	30	21	24	64
	Northbound	5/28/2003	Wed	5:15-6:15pm	15	32	21	24	100
	Southbound	5/28/2003	Wed	5:15-6:15pm	15	30	21	24	92

4. Traffic Analysis

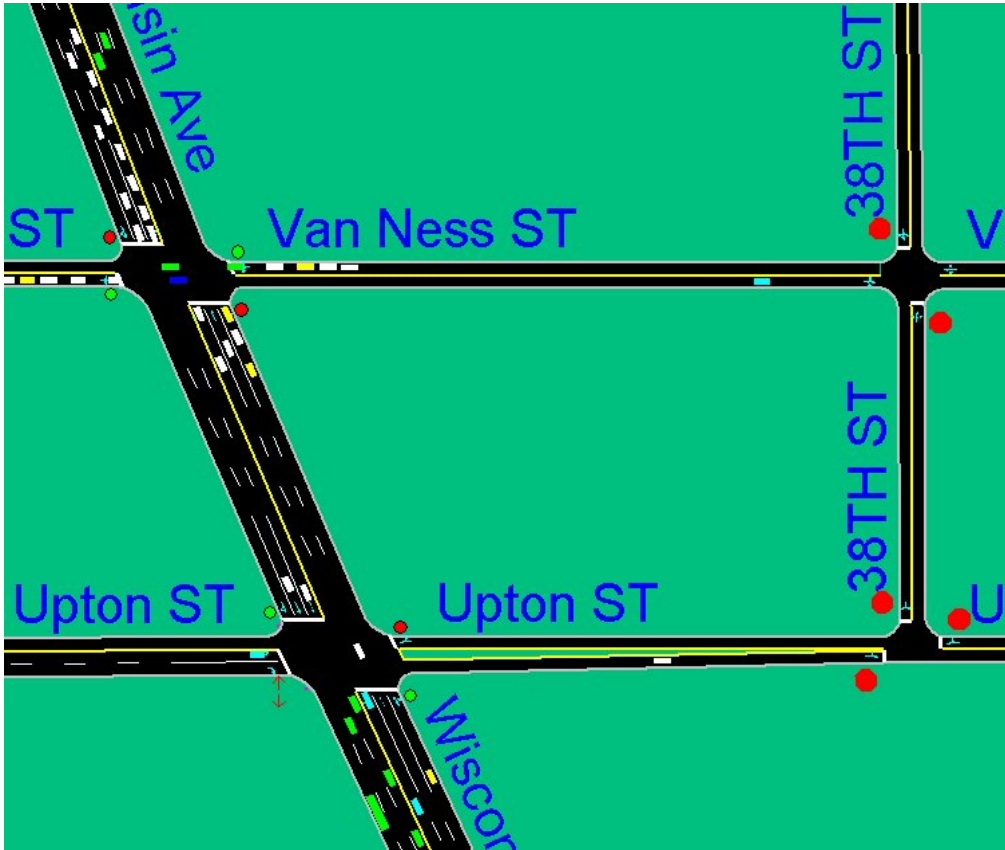


Figure 12 Real-time traffic flow simulation

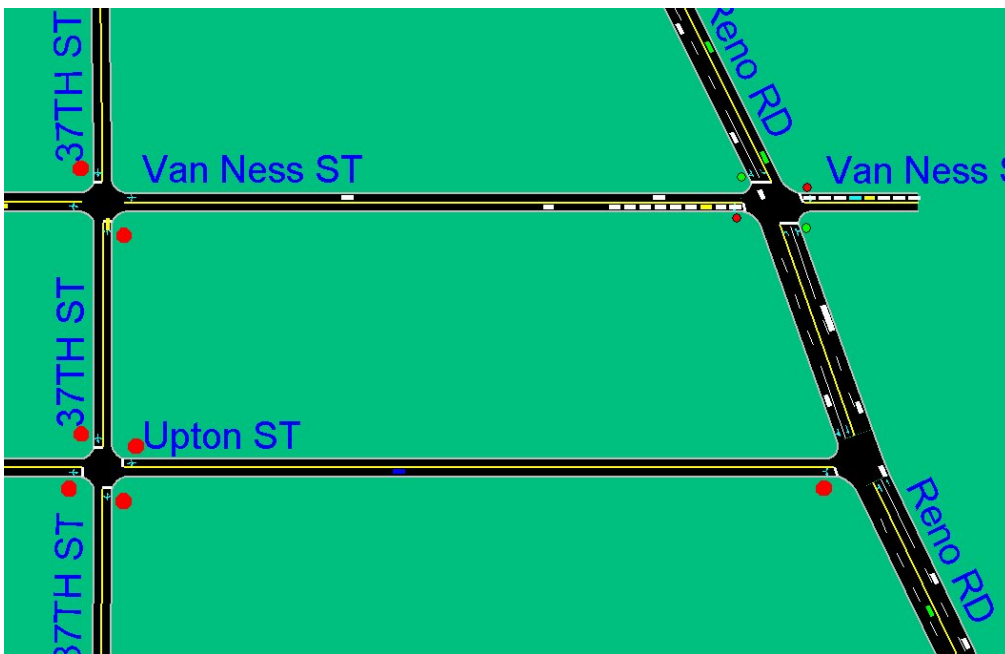





















Figure 13 Real-time traffic flow simulation

Table 10 Level of Service at intersection with Wisconsin Ave, NW (AM)

Lanes, Volumes, Timings

1: Upton ST & Wisconsin Ave

7/14/2003

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91
Ped Bike Factor	0.92	0.86			0.95			0.99			0.99	
Frt		0.855			0.972			0.979			0.992	
Flt Protected	0.950				0.989			0.993				
Satd. Flow (prot)	1770	1374	0	0	1738	0	0	4875	0	0	5019	0
Flt Permitted	0.565				0.894			0.639				
Satd. Flow (perm)	966	1374	0	0	1539	0	0	3137	0	0	5018	0
Satd. Flow (RTOR)		133			14			77			15	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume (vph)	15	6	172	36	87	32	137	738	146	16	1540	87
Confl. Peds. (#/hr)	79		79	79		79	28		28	28		28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	7	187	39	95	35	149	802	159	17	1674	95
Lane Group Flow (vph)	16	194	0	0	169	0	0	1110	0	0	1786	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8			5	2			6
Permitted Phases	4			8			2			6	6	
Minimum Split (s)	21.0	21.0		21.0	21.0		10.0	21.0		21.0	21.0	
Total Split (s)	26.0	26.0	0.0	26.0	26.0	0.0	10.0	64.0	0.0	54.0	54.0	0.0
Total Split (%)	29%	29%	0%	29%	29%	0%	11%	71%	0%	60%	60%	0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.0	1.0		1.0	1.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Act Effct Green (s)	22.0	22.0		22.0			60.0			50.0		
Actuated g/C Ratio	0.24	0.24		0.24			0.67			0.56		
w/c Ratio	0.07	0.44		0.44			0.50			0.64		
Uniform Delay, d1	26.1	8.5		26.2			6.0			13.6		
Delay	26.7	10.6		26.9			6.1			2.9		
LOS	C	B		C			A			A		
Approach Delay		11.8		26.9			6.1			2.9		
Approach LOS		B		C			A			A		

Intersection Summary

Cycle Length: 90

Offset: 74 (82%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum w/c Ratio: 0.64

Intersection Signal Delay: 5.8

Intersection LOS: A

Intersection Capacity Utilization 88.8%

ICU Level of Service D

Splits and Phases: 1: Upton ST & Wisconsin Ave



Table 11 Level of Service at intersection with Reno RD, NW (AM)

Lanes, Volumes, Timings

4: Upton ST & Reno RD

7/14/2003





























						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.873				0.997	
Frt Protected	0.997			0.989		
Satd. Flow (prot)	1621	0	0	3500	3529	0
Frt Permitted	0.997			0.989		
Satd. Flow (perm)	1621	0	0	3500	3529	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Volume (vph)	16	241	178	640	746	17
Confl. Peds. (#/hr)	1	1	1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	262	193	696	811	18
Lane Group Flow (vph)	279	0	0	889	829	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 75.1% ICU Level of Service C						

Table 12 Level of Service at intersection with Wisconsin Ave, NW (PM)

Lanes, Volumes, Timings

1: Upton ST & Wisconsin Ave

7/14/2003

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91
Ped Bike Factor	0.94	0.92			0.91			0.99			1.00	
Frt		0.888			0.913			0.990			0.998	
Flt Protected	0.950				0.991			0.995			0.999	
Satd. Flow (prot)	1770	1522	0	0	1570	0	0	4957	0	0	5059	0
Flt Permitted	0.590				0.951			0.736			0.999	
Satd. Flow (perm)	1029	1522	0	0	1480	0	0	3658	0	0	5058	0
Satd. Flow (RTOR)		12			97			27			3	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume (vph)	41	4	11	26	23	89	107	955	75	9	851	12
Confl. Peds. (#/hr)	57		57	57		57	50		50	50		50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	4	12	28	25	97	116	1038	82	10	925	13
Lane Group Flow (vph)	45	16	0	0	150	0	0	1236	0	0	948	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4						2			6	6	
Minimum Split (s)	21.0	21.0		21.0	21.0		9.0	21.0		21.0	21.0	
Total Split (s)	26.0	26.0	0.0	26.0	26.0	0.0	20.0	64.0	0.0	44.0	44.0	0.0
Total Split (%)	29%	29%	0%	29%	29%	0%	22%	71%	0%	49%	49%	0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.0	1.0		1.0	1.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Act Effct Green (s)	22.0	22.0			22.0			60.0			40.0	
Actuated g/C Ratio	0.24	0.24			0.24			0.67			0.44	
w/c Ratio	0.18	0.04			0.34			0.46			0.42	
Uniform Delay, d1	26.9	6.4			9.4			6.5			17.0	
Delay	27.6	15.5			11.6			6.5			10.1	
LOS	C	B			B			A			B	
Approach Delay		24.5			11.6			6.5			10.1	
Approach LOS		C			B			A			B	

Intersection Summary

Cycle Length: 90

Offset: 74 (82%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum w/c Ratio: 0.46

Intersection Signal Delay: 8.7

Intersection LOS: A

Intersection Capacity Utilization 69.5%

ICU Level of Service B

Splits and Phases: 1: Upton ST & Wisconsin Ave

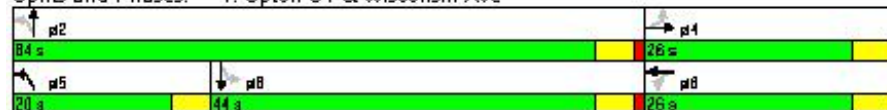


Table 13 Level of Service at intersection with Reno RD, NW (PM)

Lanes, Volumes, Timings

4: Upton ST & Reno RD

7/14/2003











						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor						
Frt	0.868				0.990	
Frt Protected	0.999			0.996		
Satd. Flow (prot)	1615	0	0	3525	3504	0
Frt Permitted	0.999			0.996		
Satd. Flow (perm)	1615	0	0	3525	3504	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Volume (vph)	2	96	95	956	605	43
Confl. Peds. (#/hr)	1	1				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	104	103	1039	658	47
Lane Group Flow (vph)	106	0	0	1142	705	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 68.3% ICU Level of Service B						

Table 14 Upton Street Traffic Accidents in Recent Three Years

Year	Wisconsin Ave	38 th Street	37 th Street	Reno Road
2002	16	1	2	2
2001	15	1	0	2
2000	11	0	0	0

Table 15 Van Ness Street Traffic Accidents in Recent Three Years

Year	Wisconsin Ave	38 th Street	37 th Street	Reno Road
2002	7	1	0	0
2001	11	0	0	3
2000	16	1	0	0

5. Traffic Calming Measures

Table 16 Speed Impacts Downstream of Traffic Calming Measures

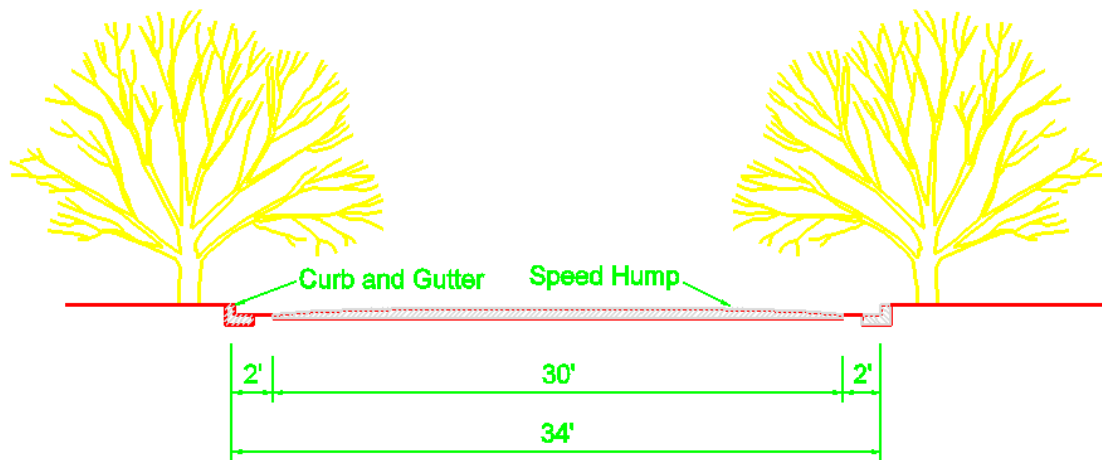
Sample Measures	Average Speed After Calming (MPH)	Percentage Change
12-foot Speed Humps	27.4	-22%
22-foot tables	30.1	-18%
Longer tables	31.6	-9%
Raised intersections	34.3	-1%
Circles	30.3	-11%
Narrowings	32.3	-4%
One-lane slow points	28.6	-14%
Half closures	26.3	-19%
Diagonal diverters	27.9	-4%

Sources: R. Ewing, Traffic Calming – State of the Practice, Institute of Transportation Engineers, Washington DC, 1999

Table 17 Volume Impacts of Traffic Calming Measures

Sample Measures	Average Change In Volume (VPD)	Percentage Change
12-foot Speed Humps	-355	-18%
22-foot tables	-415	-12%
Circles	-293	-5%
Narrowing	-263	-10%
One-lane slow points	-392	-20%
Full closures	-647	-44%
Half closures	-1611	-42%
Diagonal diverters	-501	-35%
Other volume controls	-1167	-31%

Sources: R. Ewing, Traffic Calming – State of the Practice, Institute of Transportation Engineers, Washington DC, 1999



Typical Cross Section

Figure 14 Typical Cross Section of Upton Street, N.W. With Proposed Speed Humps Installed

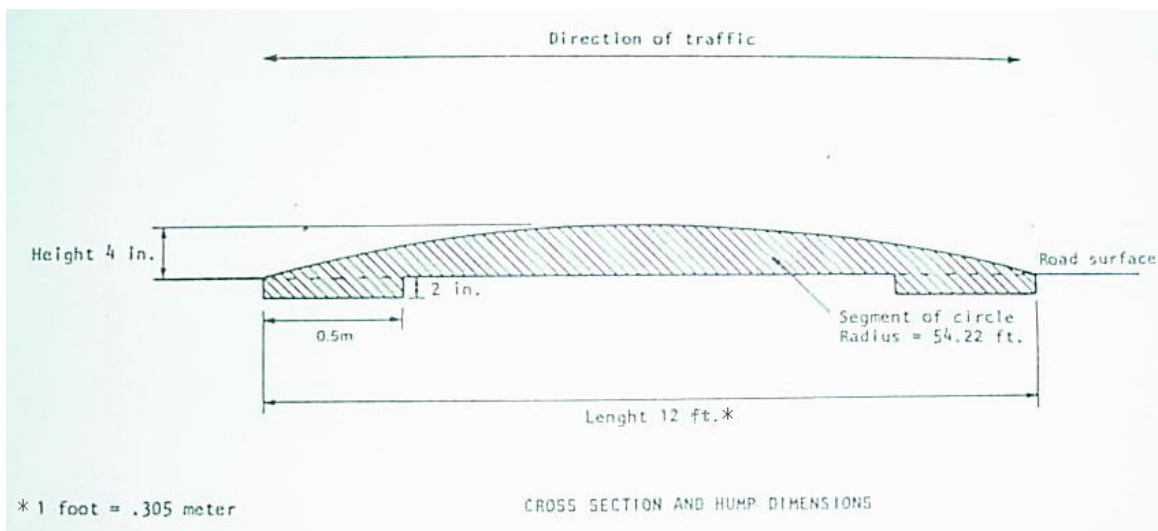


Figure 15 Cross Section of Proposed Speed Hump

VI REFERENCE

- [1] *District of Columbia Traffic Calming Policies and Guidelines*, 2002, District Department of Transportation
- [2] *Traffic Calming – State of the Practice*, 1999, Reid Ewing, Institute of Transportation Engineers, Washington DC
- [3] *Traffic Calming Protocol Manual*, 2001, DOWL Engineers, Alaska